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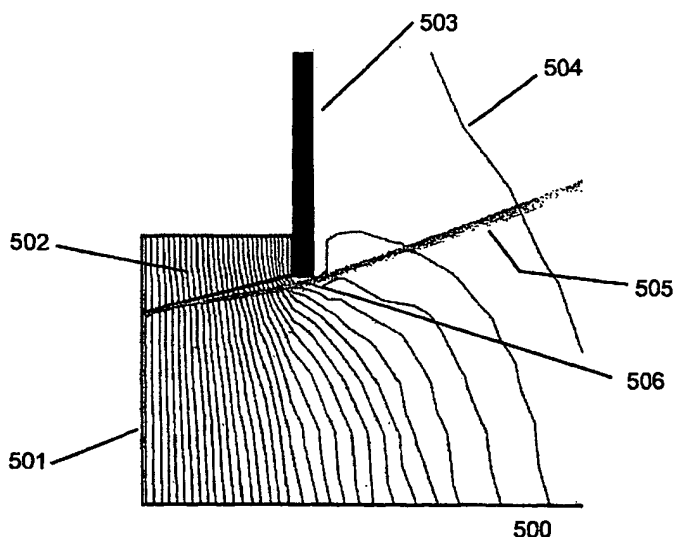
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[Continued on next page]

(54) Title: FIELD EMITTERS AND DEVICES



(57) Abstract: A broad area field electron emitter comprises a plurality of emitter cells of layered structure. Each cell comprises a hole having a layer of field electron emission material (501) at its base. A gate electrode (503) is spaced from the emitter layer (501) by a dielectric material (502) having a first region in contact with the emitter layer (501) and a second region in contact with the gate electrode (503). The cell diameter is greater at the level of the gate, (503) than at the level of the emitter layer (501), thus enabling electrons in electron beam (505) and emitted from sites adjacent to the side walls of the cell to avoid interception by the gate (503) at point (506). This reduces cell-wall charge between the first and second regions of dielectric material (502), and other means for achieving this are disclosed.

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FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/050809

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01J1/304 H01J31/12 H01J3/02 H01J9/02 H01J29/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	✓ GB 2 339 961 A (* SONY CORPORATION) 9 February 2000 (2000-02-09) abstract page 27, lines 5-10 page 28, lines 21-24 page 29, lines 12-21 page 33, line 31 - page 36, line 22 page 37, line 26 - page 38, line 10 page 39, line 19 - page 40, line 16 page 49, lines 1-12 page 50, line 27 - page 51, line 29 page 57, line 6 - page 58, line 12 -----	1,2,4
A		3

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

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Authorized officer

Gols, J

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2004/050809

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-4

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-4

Claims 1 - 4 are directed to a broad field electron emitter comprising a cell having tapered walls.

2. claims: 1,5,6

Claims 1, 5 and 6 are directed to a broad field electron emitter comprising a current leaking path.

3. claims: 1,7, 8

Claims 1, 7 and 8 are directed to a broad field electron emitter comprising a low secondary electric yield material.

4. claims: 1,9-17

Claims 1 and 9 - 17 are directed to a broad field electron emitter comprising a focus electrode.

5. claims: 1,18,19

Claims 1, 18 and 19 are directed to a broad field electron emitter comprising porous dielectric material.

6. claims: 1,20-35

Claims 1, 20 and 35 are directed to a broad field electron emitter comprising current driving and limiting means.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/050809

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2339961	A	09-02-2000	GB 2349271 A ,B	25-10-2000
			JP 2000235832 A	29-08-2000
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